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TELEPHONE RECEIVER.

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To all whom it may concern:

Be it known that I, JOSEPH A. WILLIAMS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Telephone Receivers, of which the following is a full, clear, and exact description.

This invention relates to a telephone receiver adapted for both wireless and ordinary wire telephone systems and is an improvement over the construction constituting the subject matter of my prior application Serial No. 549,832, filed April 5, 1922.

In my prior application referred to, I have disclosed a receiver wherein increased sensitiveness is obtained both by the provision of means whereby the permanent magnet flux is increased, and also by an arrangement wherein there is a larger available space for the coil, permitting a larger number of turns and greater ampere turns for a given current value, with the result that for even a very feeble current a relatively large ampere turn value is obtained.

In said application the above objects were attained by utilizing a cup-shaped metal housing for the coil and its core, and by making use of the housing, core and diaphragm or part of said elements as permanent magnets, the fields produced by the magnets assisting one another to produce an intense flux. By the use of these elements or part of them to produce a permanent magnet flux and by doing away with the permanent magnet which serves that function only, a feature of compactness is obtained to a high degree, and though the size of the receiver as a whole is small, there is a relatively large space permitted for a coil of many turns. Thus with a receiver of a small size, I am able to improve all factors which bring about sensitiveness to minute electric currents in the receiver coil.

The principal object of the present invention is to obtain still greater sensitiveness for the amount of material employed in the receiver; also to provide certain features of construction wherein the housing and core, and if desired, also the diaphragm may be used to greater advantage as permanent magnets. A further object is to so form the diaphragm that when vibrated it is capable of being flexed in a more uniform manner than with an ordinary diaphragm, and so that it will give vibrations of greater amplitude for a given change in the flux and thus produce stronger sound waves for given ampere turns in the coil.

In the accompanying sheet of drawings wherein I have shown an embodiment of the invention which operates very effectively, Fig. 1 is a vertical sectional view of a receiver embodying my invention; Fig. 2 is a transverse sectional view of the same; Fig. 3 is a vertical sectional view of the cup-shaped housing detached; Fig. 4 is a similar view of the cup of which the housing is formed, showing how the metal may be removed to form the final desired shape; Figs. 5 and 6 are transverse sectional views on an enlarged scale through a diaphragm formed in accordance with my invention, Fig. 6 showing a slight modification over the construction shown in Fig. 4; and Fig. 7 is a face view of the diaphragm.

Referring to the drawings, it will be observed that the receiver here illustrated is of the same general design as that constituting the subject matter of my prior application. The construction herein illustrated includes a cup-shaped housing 10 which receives a coil 11 surrounding a centrally arranged core 12 having at its upper end a slightly enlarged head 12^a and having a reduced lower end 12^b extending through an opening 10^a at the center of the base of the housing 10 and secured in position by nuts 13, the nuts and core serving also to clamp the coil to the base of the cup or housing, the ends of the coil having the usual insulating disks 14.

The upper or open end of the cup-shaped housing 10 is closed by a vibratory diaphragm 15 which is clamped to the top of the housing 10 by a cap 16, preferably formed of insulating material such as rubber, bakelite or the like, this cap having in this instance a down-turned flange threaded on the interior and screwed down onto an externally threaded ring 17, preferably formed separate from the housing for a purpose to be explained, and secured thereto in a suitable manner as by brazing.

In this instance the housing 10 and core 12 are preferably formed of good magnet steel and constitute the permanent magnets of the receiver, though as in the preceding case the vibratory diaphragm may also be used as a permanent magnet.